PART B

SOLAR - GEOPHYSICAL DATA

ISSUED
DECEMBER 1955

U. S. DEPARTMENT OF COMMERCE
NATIONAL BUREAU OF STANDARDS
CENTRAL RADIO PROPAGATION LABORATORY
BOULDER, COLORADO

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SOLAR - GEOPHYSICAL DATA

INTRODUCTION

This monthly report series is intended to keep research workers abreast of the major particulars of solar activity and the associated ionospheric, radio propagation and other geophysical effects. It is made possible through the cooperation of many observatories, laboratories and agencies as recorded in the detailed description of the tables and graphs which follows. The Editor is Miss J. V. Lincoln.

I RELATIVE SUNSPOT NUMBERS

American and Zürich Daily Numbers -- The table lists (1) the daily American relative sunspot numbers, R_A', as compiled by the Solar Division of the American Association of Variable Star Observers, and (2) the provisional daily Zürich relative sunspot numbers, R_Z, as communicated by the Swiss Federal Observatory. Because of the time required to collect and reduce the observations, R_A' will normally appear one month later than R_Z.

The relative sunspot number is an index of the activity of the entire visible disk. It is determined each day without reference to preceding days. Each isolated cluster of sunspots is termed a sunspot group and it may consist of one or a large number of distinct spots whose size can range from 10 or more square degrees of the solar surface down to the limit of resolution (e.g. 1/8 square degrees). The relative sunspot number is defined as $R=K(10g+s)$, where g is the number of sunspot groups and s is the total number of distinct spots. The scale factor K (usually less than unity) depends on the observer and is intended to effect the conversion to the scale originated by Wolf. The observations for sunspot numbers are made by a rather small group of extraordinarily faithful observers, many of them amateurs, each with many years of experience. The counts are made visually with small, suitably protected telescopes.

Final values of R_Z appear in the IAU Quarterly Bulletin on Solar Activity, the Journal of Geophysical Research and elsewhere. They usually differ slightly from the provisional values. The American numbers, R_A', are not revised.

Graph of Sunspot Cycle -- The graph illustrates the recent trend of Cycle 19 of the 11-year sunspot cycle and some predictions of the future level of activity. The customary "12-month" smoothed

index, $\overline{R}$, is used throughout, the data being final R_Z numbers except for the current year. Predictions shown are those made for one year after the latest available datum by the method of A. G. McNish and J. V. Lincoln (Trans. Am. Geophys. Union, 30, 673-685, 1949) modified by the use of regression coefficients and mean cycle values recomputed for Cycles 8 through 18. Cycle 19 began April 1954, when the minimum $\overline{R}$ of 3.4 was reached.

II SOLAR CENTERS OF ACTIVITY

Calcium Plage and Sunspot Regions -- The table gives particulars of the centers of activity visible on the solar disk during the preceding month. These are based on estimates made and reported on the day of observation and are therefore of limited reliability.

The table gives the heliographic coordinates of each center (taken as the calcium plage unless two or more significantly and individually active sunspot groups are included in an extended plage) in terms of the Greenwich date of passage of the sun's central meridian (CMP) and the latitude; the serial number of the plage as assigned by McMath-Hulbert Observatory; the serial number of the center in the previous solar rotation, if it is a persisting region; particulars of the plage at three times during its transit of the visible disk (first appearance, maximum development, last appearance): the date, the area, the central intensity; particulars of the associated sunspot group, if any, at analogous times: the date, the area, the spot count. The unit of area is a millionth of the area of a solar hemisphere; the central intensity of calcium plages is roughly estimated on a scale of 1=faint to 5=very bright.

Calcium plage data are available through the cooperation of the McMath-Hulbert Observatory of the University of Michigan and the Mt. Wilson Observatory. The sunspot data are compiled from reports from the U. S. Naval Observatory, Mt. Wilson Observatory, and from reports from Europe and Japan received through the daily Ursigram messages.

Coronal Line Emission Indices -- In the table are summarized solar coronal emission intensity indices for the green (Fe XIV at λ5303) and red (Fe X at λ6374) coronal lines. The indices are based on measurements made at 5° intervals around the periphery of the solar disk by the High Altitude Observatory at Climax, Colorado, and by Harvard University observers at Sacramento Peak (The USAF Upper Air Research Observatory at Sunspot, New Mexico, under contract AF 19(604)-146). The measurements are expressed as the number of millionths of an Angstrom of the continuum of the center of the solar disk (at the same wavelength as the line) that would contain the same energy as the observed coronal line. The indices have the following meanings:

G_6 = mean of six highest line intensities in quadrant for λ 5303.

R_6 = same for λ6374.

G_1 = highest value of intensity in quadrant, for λ5303.

R_1 = same for λ6374.

The dates given in the table correspond to the approximate time of CMP of the longitude zone represented by the indices. The actual observations were made for the North East and South East quadrants 7 days before; for the South West and North West quadrants 7 days after the CMP date given.

To obtain rough measures of the integrated emission of the entire solar disk in either of the lines, assuming the coronal changes to be small in a half solar rotation, it is satisfactory to perform the following type of summation given in example for 15 October:

$$\left(\begin{matrix}\text{MEAN DISK EMISSION}\\ \text{IN } \lambda 5303\end{matrix}\right)_{15\ \text{OCT}} = \frac{1}{N}\left[\sum_{15\ \text{OCT}}^{22\ \text{OCT}}\left\{(G_6)_{NE} + (G_6)_{SE}\right\} + \sum_{8\ \text{OCT}}^{14\ \text{OCT}}\left\{(G_6)_{SW} + (G_6)_{NW}\right\}\right]$$

where N is the number of indices entering the summation.

Such integrated disk indices as well as integrated whole-sun indices are computed for each day and are published quarterly in the "Solar Activity Summary" issued by the High Altitude Observatory at Boulder, Colorado. In the same reports are given maps of the intensity distribution of coronal emission derived from all available Climax and Sacramento Peak observations, as well as other information on solar activity, such as maps made from daily limb prominence surveys in Hα and notes regarding the history of active regions on the solar disk.

Preliminary summaries of solar activity, prepared on a fast schedule, are issued Friday of each week from High Altitude Observatory in conjunction with CRPL and include solar activity through the preceding day. These are useful to groups needing information on the current status of activity on the visible solar disk, but are not recommended for research uses unless such a prompt schedule of reporting is essential. The same information is included in the subsequent quarterly reports, with extensive additions, corrections and evaluations.

III SOLAR FLARES

Optical Observations -- The table presents the preliminary record of solar flares as reported to the CRPL on a rapid schedule at the sacrifice of detailed accuracy. Definitive and complete data are published later in the Quarterly Bulletin of Solar Activity, I.A.U., in various observatory publications and elsewhere. The present listing serves to identify and roughly describe the phenomena observed.

Reporting directly to the CRPL are the following observatories: Mt. Wilson, McMath-Hulbert, U. S. Naval, Wendelstein, and Sacramento Peak. The remainder report through the URSIgram centers in Europe and Japan. Observations are in the light of the center of the H-alpha line unless noted otherwise. The reports from Sacramento Peak, New Mexico (communicated to CRPL by the High Altitude Observatory at Boulder) are from observations at the USAF Upper Air Research Observatory at Sunspot, New Mexico, by Harvard University observers, under contract AF 19(604)-146.

For each flare are listed the reporting observatory, date, times of beginning and ending of observing period, duration of flare (when known), total area in millionths of visible hemisphere, the McMath serial number of the region with which the flare is associated, the heliographic coordinates in degrees, the time of maximum phase, maximum intensity of flare, fractional area having nearly maximum brightness, and finally the flare importance on the IAU scale of 1- to 3+. A final column lists provisionally the occurrence of simultaneous ionospheric effects as observed on selected field strength recordings of distant high-frequency radio transmissions; a more nearly definitive list of these ionospheric effects, including particulars, appears in these reports after the lapse of a month (see below). All times are Universal Time (UT or GCT).

Ionospheric Effects -- SID (and GID--gradual ionospheric disturbances) may be detected in a number of ways: short wave fadeouts, enhancement of low frequency atmospherics, increases in cosmic absorption, and so forth. The table lists events that have been recognized on field strength recordings of distant high-frequency radio transmissions. Under a coordinated program, the staffs at the following ionospheric sounding stations contribute reports that are screened and synthesized at CRPL-Boulder: Puerto Rico, Ft. Belvoir, Va., and Anchorage, Alaska (CRPL Stations: PR, BE, AN); Huancayo, Peru, and College, Alaska (CRPL-Associated Laboratories: HU, CO); and White Sands, N. Mex., Adak, Alaska, and Okinawa (U. S. Signal Corps Stations: WS, AD, OK). McMath-Hulbert Observatory (MC) also contributes such reports. In addition, reports are volunteered by RCA Communications Inc.,

Marconi Wireless, Netherlands Postal and Telecommunications Services, Swedish Telecommunications, and others; these usually specify times of SID and the radio paths involved.

In the coordinated program, the abnormal fades of field strength not obviously ascribable to other causes, are described as short wave fadeouts with the following further classification:

S-SWF: sudden drop-out and gradual recovery
Slow S-SWF: drop-out taking 5 to 15 minutes and gradual recovery
G-SWF: gradual disturbance; fade irregular in both drop-out and recovery.

When there is agreement among the various reporting stations on the time (UT) of an event, it is accepted as a widespread phenomenon and listed in the table.

The degree of confidence in identifying the event, a subjective estimate, is reported by the stations and this is summarized in an index of certainty that the event is widespread, ranging from 1 (possible) to 5 (definite). The times given in the table for the event are from the report of a station (underlined in table) that identified it with high confidence. The criteria for the subjective importance rating assigned by each station on a scale of 1- to 3+ include amplitude of the fade, duration and confidence; greater consideration is given to reports on paths near the subsolar point in arriving at the summary importance rating given in the table.
Note: The tables of SID observed at Washington included in CRPL F-reports prior to F-135 were restricted to events classed here as S-SWF.

IV SOLAR RADIO WAVES

The data on solar radio waves are from observations at 167 Mc and 460 Mc made at the Gunbarrel Hill (Boulder) station of the National Bureau of Standards. The half-width of the antenna lobe is appreciably greater than the solar disk. Polarization has not been determined. All times are in Universal Time (UT or GCT); when the observing period extends slightly into the next Greenwich day, the time scale is extended beyond 24 hours.

3-hourly and Daily Flux -- Flux is given in power units. These units are approximately 10^{-22} watt meter^{-2}(c/s)$^{-1}$ for both polarizations together. They will be subject to a correction factor when gain measurements of the antenna have been made. The median flux is measured for every one-hour period that contains a usable calibration and at least thirty minutes of usable record. A three-hour value of flux is obtained by averaging the available one-hour medians (at least two required). A daily value of flux is obtained by averaging all available one-hour medians (at least 4 required). A dash indicates that insufficient measurements were made to meet the above requirements or that the records were not of usable quality. Parentheses indicate that the value is somewhat doubtful because of atmospheric noise or local interference.

The variability index, given for each three-hour interval, is on a scale 0 to 3 defined as follows:

0 - The instantaneous flux did not drop below one-half the median level or exceed twice the median level at any time.

1 - The instantaneous flux made from one to ten excursions outside the range described above.

2 - The instantaneous flux made from ten to one hundred excursions outside the range described above.

3 - The instantaneous flux made more than one hundred excursions outside the range described above.

For the purpose of the variability index, an excursion whose maximum intensity is M times the median level is counted as M excursions. A dash is used to indicate that measurements were made for less than one hour during the period. Parentheses surround variability indices which are in doubt because of atmospheric noise or local interference.

Outstanding Events -- A separate table lists the occurrences that are not adequately described by the three-hourly values of median flux and variability. These are classified in general accordance with the system described and illustrated by Dodson, Hedeman, and Owren (Ap. J. 118, 169, 1953). The categories of events are identified in the table by numbers, which do not necessarily indicate the magnitude of the event:

0 - Rise in base level -- A temporary increase in the continuum with duration of the order of tens of minutes to an hour.

1 - Series of bursts -- Bursts or groups of bursts, occurring intermittently over an interval of time of the order of minutes or hours. Such series of bursts are assigned as distinctive events only when they occur on a smooth record or show as a distinct change in the activity.

2 - Groups of bursts -- A cluster of bursts occurring in an interval of time of the order of minutes.

3 - Minor burst -- A burst of moderate or small amplitude, and duration of the order of one or two minutes.

4 - Minor burst and second part -- A double rise in flux in which the early rise is a minor burst.

5 - Noise storm ends -- A noise storm (see 6) which ceases at some time during the observing period.

6 - Noise storm -- A temporary increase in radiation characterized by numerous closely spaced bursts, by an increase in the continuum, or by both. Duration is of the order of hours or days.

7 - Noise storm begins -- The onset of a noise storm occurs at some time during the observing period.

8 - Major burst -- An outburst, or other burst of large amplitude and more than average duration. A major burst is usually complex, with a duration of the order of one to ten minutes.

9 - Major burst and second part -- A double rise in flux, the first part of which is a major burst. The second part may consist of a rise in base level, a group or series of bursts, or the onset of a noise storm.

Starting times and durations are enclosed in parentheses when they are limited by the period of observation. The maximum instantaneous flux (Inst. Flux) is measured from the sky level as are the hourly medians. The maximum smoothed flux (Smd. Flux) is that obtained by taking the difference of the maximum value of a smooth curve drawn through the outstanding occurrence with a smoothing period of 20 percent to 50 percent of the total duration, and the value of the interpolated hourly median at that same time had the event not occurred, both measured from the sky level.

V GEOMAGNETIC ACTIVITY INDICES

C, Kp, Ap, and Selected Quiet and Disturbed Days -- The data in the table are: (1) preliminary international character figures, C; (2) geomagnetic planetary three-hour range indices, Kp; (3) daily "equivalent amplitude," Ap; (4) magnetically selected quiet and disturbed days.

This table is made available by the Committee on Characterization of Magnetic Disturbance of IAGA, IUGG. The Meteorological Office, De Bilt, Holland collects the data from magnetic observatories distributed throughout the world, and compiles C and selected days. The Chairman of the Committee computes the planetary and equivalent amplitude indices. The same data are also published quarterly in the Journal of Geophysical Research along with data on sudden commencements (sc) and solar flare effects (sfe).

The C-figure is the arithmetic mean of the subjective classification by all observatories of each day's magnetic activity on a scale of 0 (quiet) to 2 (storm).

Kp is the mean standardized K-index from 12 observatories between geomagnetic latitudes 47 and 63 degrees. The scale is 0 (very quiet) to 9 (extremely disturbed), expressed in thirds of a unit, e.g. 5- is 4 2/3, 5o is 5 0/3, and 5+ is 5 1/3. This planetary index is designed to measure solar particle-radiation by its magnetic effects, specifically to meet the needs of research workers in the ionospheric field. A complete description of Kp has appeared in Bulletin 12b, "Geomagnetic Indices C and K, 1948" of the Association of Terrestrial Magnetism and Electricity (IATME), International Union of Geodesy and Geophysics.

Ap is a daily index of magnetic activity on a linear scale rather than on the quasi-logarithmic scale of the K-indices. It is the average of the eight values of an intermediate 3-hourly index "ap," defined as one-half the average gamma range of the most disturbed of the three force components, in the three-hour interval at standard stations; in practice, ap is computed from the Kp for the 3-hour interval. The extreme range of the scale of Ap is 0 to 400. The method is described in IATME Bulletin No. 12h (for 1953) p. viii f. Values of Ap (like Kp and Cp) have been published for the Polar Year 1932/33 and for the years 1937 onwards.

The magnetically quiet and disturbed days are selected in accordance with the general outline in Terr. Mag. (predecessor to J. Geophys. Res.) 48, pp 219-227, December 1943. The method in current use calls for ranking the days of a month by their geomagnetic activity as determined from the following three criteria with equal weight: (1) the sum of the eight Kp's; (2) the sum of the squares of the eight Kp's; and (3) the greatest Kp.

Chart of Kp by Solar Rotations -- The graph of Kp by solar rotations is furnished through the courtesy of Dr. J. Bartels, Geophysikalisches Institute, Göttingen.

VI RADIO PROPAGATION QUALITY INDICES

One can take as the definition of a radio propagation quality index: the measure of the efficiency of a medium-powered radio circuit operated under ideal conditions in all respects, except for the variable effect of the ionosphere on the propagation of the transmitted signal. The indices given here are derived from monitoring and circuit performance reports, and are the nearest practical approximation to the ideal index of propagation quality.

Quality indices are usually expressed on a scale that ranges from one to nine. Indices of four or less are generally taken to represent significant disturbance. (Note that for geomagnetic K-indices, disturbance is represented by higher numbers.) The adjectival equivalents of the integral quality indices are as follows:

1 = useless	4 = poor-to-fair	7 = good
2 = very poor	5 = fair	8 = very good
3 = poor	6 = fair-to-good	9 = excellent

CRPL forecasts are expressed on the same scale. The tables summarizing the outcome of forecasts include categories P-Perfect; S-Satisfactory; U-Unsatisfactory; F-Failure. The following conventions apply:

P - forecast quality equal to observed

S - forecast quality one grade different from observed

U - forecast quality two or more grades different from observed when <u>both</u> forecast and observed were $\geqslant 5$, or both $\leqslant 5$

F - other times when forecast quality two or more grades different from observed

Full discussion of the reliability of forecasts requires consideration of many factors besides the over-simplified summary given.

The quality figures represent a consensus of experience with radio propagation conditions. Since they are based entirely on monitoring or traffic reports, the reasons for low quality are not necessarily known and may not be limited to ionospheric storminess. For instance, low quality may result from improper frequency usage for the path and time of day. Although, wherever it is reported, frequency usage is included in the rating of reports, it must often

be an assumption that the reports refer to optimum working frequencies. It is more difficult to eliminate from the indices conditions of low quality for reasons such as multipath or interference. These considerations should be taken into account in interpreting research correlations between the Q-figures and solar, auroral, geomagnetic or similar indices.

North Atlantic Radio Path -- The CRPL quality figures, Qa, are compiled by the North Atlantic Radio Warning Service (NARWS), the CRPL forecasting center at Ft. Belvoir, Virginia, from radio traffic data for North Atlantic transmission paths closely approximating New York-to-London. These are reported to CRPL by the Canadian Defense Research Board, Canadian Broadcasting Company, and the following agencies of the U. S. Government:--Coast Guard, Navy, Army Signal Corps, U. S. Information Agency. Supplementing these data are CRPL monitoring, direction-finding observations and field strength measurements of North Atlantic transmissions made at Belvoir.

The original reports are submitted on various scales and for various time intervals. The observations for each 6-hour interval are averaged on the original scale. These 6-hour indices are then adjusted to the 1 to 9 quality-figure scale by a conversion table prepared by comparing the distribution of these indices for at least four months, usually a year, with a master distribution determined from analysis of the reports originally made on the 1 to 9 quality-figure scale. A report whose distribution is the same as the master is thereby converted linearly to the Q-figure scale. The 6-hourly quality figure is the mean of the reports available for that period.

The 6-hourly quality figures are given in this table to the nearest one-third of a unit, e.g. 5o is 5 and 0/3; 5- is 4 and 2/3; 5+ is 5 and 1/3. Other data included are:

(a) Whole-day radio quality indices, which are weighted averages of the four 6-hourly indices, with half weight given to quality grades 5 and 6. This procedure tends to give whole-day indices suitable for comparison with whole-day advance forecasts which seek to designate the days of significant disturbance or unusually quiet conditions.

(b) Short-term forecasts, issued every six hours by the North Atlantic Radio Warning Service. These are issued one hour before 00^h, 06^h, 12^h, 18^h, UT and are applicable to the period 1 to 7 hours ahead.

(c) Advance forecasts, issued twice weekly by the NARWS (CRPL-J reports) and applicable 1 to 3 or 4 days ahead, 4 or 5 to 7 days ahead, and 8 to 25 days ahead. These forecasts are scored against the whole-day quality indices.

(d) Half-day averages of the geomagnetic K indices measured by the Cheltenham Magnetic Observatory of the U. S. Coast and Geodetic Survey.

A chart compares the short-term forecasts with Qa-figures. A second chart compares the outcome of advance forecasts (1 to 3 or 4 days ahead) with a type of "blind" forecast . For the latter, the frequency for each quality grade, as determined from the distribution of quality grades in the four most recent months of the current season, is partitioned among the grades observed in the current month in proportion to the frequencies observed in the current month.

Ranges of useful frequencies on the North Atlantic radio path are shown in a series of diagrams, one for each day. Time is the angular coordinate and radio frequency in Mc is the radius vector. The shaded area indicates the range of frequencies for which transmissions of quality 5 or greater were observed. The blacker the diagram, the quieter the day has been; a narrow strip indicates either high LUHF, low MUF or both. These diagrams are based on data reported to CRPL by the German Post Office through the Fernmeldetechnischen Zentralamtes, Darmstadt, Germany, being observations every one and a half hours of selected transmitters located in the eastern portion of North America.

Note: Beginning with data for September 1955, Qa has been determined from reports that are available within a few hours or at most within a few days, including for the first time, the CRPL observations. Therefore these are the indices by which the forecasters assess every day the conditions in the recent past. Over a period of several years, they have closely paralleled the former Qa indices which included CRPL observations and included three additional reports received after a considerable lag. Qa was first published to the nearest one-third of a unit at the same time.

North Pacific Radio Path -- The CRPL quality figures, Qp, are compiled by the North Pacific Radio Warning Service (NPRWS), the CRPL forecasting center at Anchorage, Alaska, from radio traffic data for moderately long transmission paths in the North Pacific equivalent to Seattle-to-Anchorage or Anchorage-to-Tokyo. These include reports to CRPL by the Alaskan Communications Service, Aeronautical Radio, Inc., U. S. Air Force and Civil Aeronautical Administration. In addition, there are CRPL monitoring, direction-finder observations and field strength measurements of suitable transmissions.

The original reports are on various scales and for various time intervals. The observations for each 9 hours or 24 hour period are averaged on the original scale. This average is compared with reports for the same period in the preceding two months and expressed as a deviation from the 3-month mean. The deviations are put on the 1 to 9 scale of quality which is assumed to have a standard deviation of 1.25 and a mean for the various periods as follows:

03-12 hours UT	5.33
09-18	5.33
18-03	6.00
00-24	5.67

The 9-hour and 24-hour indices Qp are determined separately. Each index is a weighted mean where the CRPL observations have unit weight and the others are weighted by the correlation coefficient with the CRPL observations.

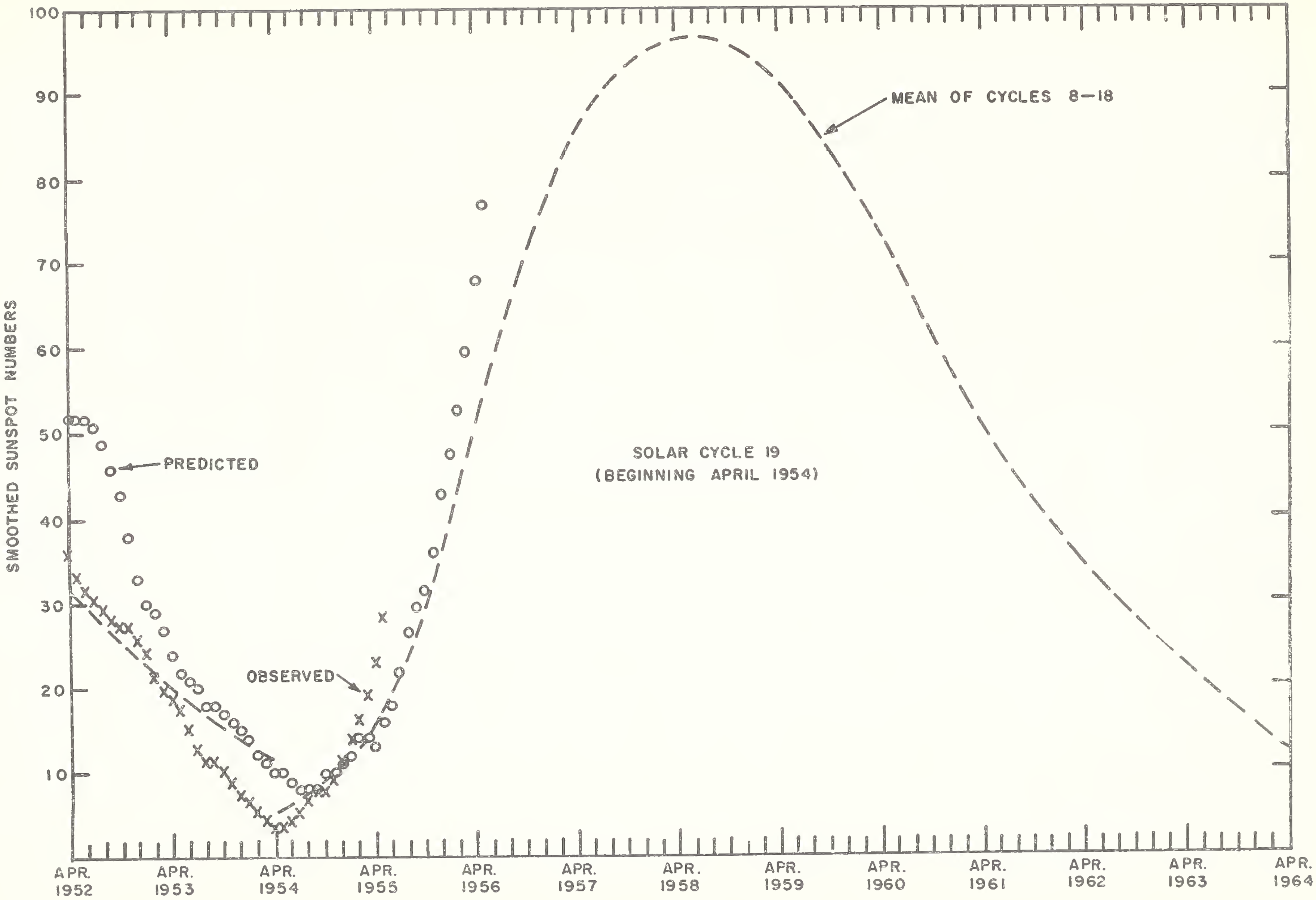
The table, analagous to that for Qa, includes the 9-hourly quality figures; whole day quality figures; short term forecasts issued by NPRWS three times dailv at 02^h, 09^h, and 18^h UT, applicable to the stated 9-hour periods; advance forecasts issued twice weekly by NPRWS (CRPL-Jp report); and half-day averages of geomagnetic K indices from Sitka.

The chart compares the outcome of advance forecasts, on the same basis as the similar chart for the North Atlantic Radio Path.

RELATIVE SUNSPOT NUMBERS

American Relative Sunspot Numbers October 1955	
Date	$R_{A'}$
1	32
2	54
3	69
4	68
5	61
6	53
7	82
8	64
9	69
10	61
11	64
12	43
13	36
14	10
15	6
16	0
17	0
18	0
19	15
20	26
21	30
22	47
23	57
24	81
25	95
26	102
27	92
28	97
29	120
30	109
31	107
Mean:	56.5

Zürich Provisional Relative Sunspot Numbers November 1955	
Date	R_Z
1	106
2	92
3	77
4	58
5	51
6	38
7	71
8	84
9	115
10	133
11	156
12	152
13	142
14	132
15	122
16	105
17	95
18	75
19	55
20	60
21	60
22	61
23	63
24	70
25	77
26	81
27	90
28	97
29	95
30	93
Mean:	90.2



PREDICTED AND OBSERVED SUNSPOT NUMBERS

CALCIUM PLAGE AND SUNSPOT REGIONS

NOVEMBER 1955

CMP Nov. 1955	Lat.	McMath Plage Number	Return of Region	Calcium Plage Data, Date-Area-Intensity			Sunspot Data, Date-Area-Count		
				First seen	Maximum	Last seen	First seen	Maximum	Last seen
1.3	N34	3315	3286,7,9	27-2500-3	27-2500-3	06- 600-2			
2.6	S23	3316	3291	27-1000-2	28-2000-2	01- 500-1			
4.0	N23	3318	3292	28-1600-2	08-3100-2	09-2000-1	28-390 -1	28- 390-1	08-120 -1
6.6	N23	3320	3295	01- 800-2	10-1100-3	12- 800-2.5			
7.7	S30	3321	3298	01-2000-3	08-4000-2.5	12-3400-2	01-240 -1	01- 240-1	12- 70--1
9.6	S18	3322	3301	05- 700-2.5	10-2000-2.5	14-1000-2	05-150 -2	08- 270-6	12- 50a-x
10.2	S26	3325	New	07- 400-2.5	14-1000-2	14-1000-2			
10.3	N27	3327	New	10- 200-2	11- 300-2	12- 200-2			
12.2	N17	3331	New	14-1000-3.5	16-2000-3.5	16-2000-3.5	14-340 -14	15- 560-7	17-350 -4
12.3	N27	3323	3303	05-1000-1.5	16-3500-2.5	16-3500-2.5	08-250 -7	10- 270-6	16- 70 -1
12.4	S16	3335	New	16- 500-3	16- 500-3	16- 500-3			
13.7	S28	3324	New	07-2000-3	08-5500-3	19-5000-4	08-610 -3	13- 880-13	18-190 -2
14.0	S40	3328	New	09- 300-2	14-2200-3	16-1100-2.5	10-100 -5	10- 100-5	12- 70 -2
15.1	N27	3326	New	08-6000-3.5	16-8000-3.5	20-4000-2	08-630 -2	14-1650-34	20-660 -3
17.1	S28	3329	New	12- 900-3	12- 900-3	16- 500-3			
18.7	N20	3330	New	12-4000-3.5	12-4000-3.5	24-2000-2.5	12-200a-x	14- 680-7	21-140 -4
19.7	S23	3332	New	14- 600-2.5	14- 600-2.5	16--200-1			
20.5	S30	3333	New	14- 600-2.5	14- 600-2.5	16- 200-2			
21.1	N19	3334	3306	14- 500-2	16-2000-2.5	25- 600-1			
22.6	S21	3336	New	22- 300-2	25- 400-1	25- 400-1			
26.3	S21	3337	3309,11	19-5700-4	24-6900-3	01-6000-3	{21-190 -1	21- 190-1	02- 50a-x
							{19- 50a-x	27- 820-12	01-490 -1
26.8	N29	3338	3308,12	20-4000-2	01-7000-2.5	03-2500-2	19- 10a-x	27- 650-9	02- 50 -x
27.6	S01	3340	New	24- 200-2.5	24- 200-2.5	25- 200-1			
29.4	N43	3339	New	22-3000-3	25-4000-3	04-4000-2.5	23-100 -1	28- 230-4	02- 50a-x

CORONAL LINE EMISSION INDICES

NOVEMBER 1955

CMP Date 1955	North East Quadrant (observed 7 days earlier)				South East Quadrant (observed 7 days earlier)				South West Quadrant (observed 7 days later)				North West Quadrant (observed 7 days later)			
	G_6	G_1	R_6	R_1	G_6	G_1	R_6	R_1	G_6	G_1	R_6	R_1	G_6	G_1	R_6	R_1
Nov.																
1	77	138	16	30	26	48	11	20	18	27	9	13	46	94	13	20
2	69	130	12	16	37	75	5	7	X	X	X	X	X	X	X	X
3	23	30	11	16	12	19	5	5	17	28	7	10	43	71	17	29
4	64	128	16	28	20	28	9	10	X	X	X	X	X	X	X	X
5	20	25	10	18	13	23	6	8	X	X	X	X	X	X	X	X
6	51	81	16	23	76	182	21	28	X	X	X	X	X	X	X	X
7	31	48	15	20	59	94	22	24	44	94	6	10	24	28	12	18
8	X	X	7	9	X	X	15	18	X	X	X	X	X	X	X	X
9	14	21	11	17	36	76	18	22	43	54	12	20	13	27	21	32
10	14	19	25	26	34	71	23	32	28	37	15	18	23	26	19	21
11	10	16	12	21	15	23	11	19	58	71	24	27	85	138	28	33
12	16	30	14	22	22	30	10	16	65	87	36	60	85	138	42	62
13	31	71	10	19	26	48	9	10	56	76	22	41	56	81	29	54
14	X	X	X	X	X	X	X	X	36	58	15	21	42	58	20	33
15	32	54	12	18	16	20	10	13	X	X	X	X	X	X	X	X
16	X	X	X	X	X	X	X	X	23	25	19	20	43	54	24	37
17	12	16	12	20	10	10	17	19	14	17	8	10	36	58	16	25
18	X	X	X	X	X	X	X	X	-	-	7	10	54	87	14	36
19	X	X	X	X	X	X	X	X	7	3	10	16	39	71	21	35
20	X	X	X	X	X	X	X	X	8	10	9	10	36	54	16	20
21	26	58	9	16	6	8	7	7	11	16	16	22	26	37	14	16
22	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
23	49	71	16	23	22	29	20	24	X	X	X	X	X	X	X	X
24	32	44	20	27	29	44	26	31	X	X	X	X	X	X	X	X
25	57	81	25	31	60	94	40	62	X	X	X	X	X	X	X	X
26	106	125	31	50	72	138	29	45	X	X	X	X	X	X	X	X
27	47	77	27	46	43	62	23	32	X	X	X	X	X	X	X	X
28	47	71	21	48	25	48	14	20	35	70	15	20	53	75	23	40
29	X	X	X	X	X	X	X	X	22	27	15	18	94	154	23	34
30	44	63	22	25	15	21	14	16	14	17	16	19	92	154	19	26

SOLAR FLARES

NOVEMBER 1955

Observatory	Date Nov. 1955	Time Observed Start UT	Time Observed End UT	Duration Min.	Total Area Mill.	McMath Plage Region Number	Approx. Position Lat.	Approx. Position Mer. Dist.	Time Max. Phase UT	Max. Int. Arb.	Rel. Area of Max. Tenths	Importance	Provis. Ionospheric Effect
S. Peak	03	b1950	2000		200	3321	S27	E51	1950	20	5	1	Slow S-SWF
McMath	08	b2002				3326	N27	E80				1	
Wendel	09	b1322			145	3326	N24	E61	1324			1	S-SWF
Neder	11	1323	1345	22		3326	N24	E38				1	
Wendel	12	1126	1159	33	436	3326	N21	E29	1133			2	S-SWF
Wendel	13	1052	1108	16	194	3326	N19	E16	1057			1	
S. Peak	14	2040	2130	50	260	3324	S20	W14	2059	18	3	1	
Neder	15	b1255				3326	N27	W10				1	S-SWF
S. Peak	15	1625	a1705		177	3326	N24	W11	1700	16	5	1	G-SWF
S. Peak	21	1620	1710	50	120	3337	S25	E60	1629	15	4	1	Slow S-SWF
S. Peak	27	1705	1835	90	228	3338	N28	W06	1715	18	6	1	G-SWF
Neder	29	1307	1322	15		3342	N22	E64				1	

Subflares noted as follows:

Region 3311: Nov. 3, 1930 UT.
Region 3308: Nov. 5, 1745 UT.
Region 3326: Nov. 8, 1430, 1740, 2000 UT; Nov. 9, 1605, 1910, 2155 UT; Nov. 10, 1845; Nov. 11, b1840, 2110 UT; Nov. 16, 1800, 1850 UT; Nov. 17, 2040 UT; Nov. 19, 1630 UT.
Region 3324: Nov. 10, 1920 UT; Nov. 12, 1910, 1925 UT; Nov. 17, 1820, 2130 UT; Nov. 18, 1805, 2050 UT.
Region 3328: Nov. 14, 2055 UT.
Region 3330: Nov. 14, 1910 UT.
Region 3331: Nov. 16, b1835, 1940 UT; Nov. 18, 1436 UT.
Region 3338: Nov. 19, 1705 UT; Nov. 20, b1625, 1655 UT; Nov. 23, 1510 UT; Nov. 26, b1645, 1930, 2045 UT.
Region 3343: Nov. 27, 1752 UT.

(All above subflares were noted at S. Peak.)

IONOSPHERIC EFFECTS OF SOLAR FLARES

OCTOBER 1955

Oct. 1955	Start UT	End UT	Type	Wide-spread Index	Impor-tance	Observation Stations
1	1945	2030	G-SWF	3	1-	AN, BE, CO, MC, PR
2	0045	0100	Slow S-SWF	3	1-	AN, Japan*
	1940	2000	G-SWF	2	1	AN, BE, HU
3	1330	1425	G-SWF	1	1-	BE, CO
5	0120	0135	S-SWF	1	1-	AN, CO
	2232	2300	Slow S-SWF	1	1-	AN, BE
6	1740	1810	G-SWF	1	1-	AN, HU
9	2215	2220	Slow S-SWF	1	1-	AN, BE
10	1800	1835	G-SWF	2	1-	AN, BE, MC
22	2344	2355	G-SWF	1	1-	AN, PR
25	1420	1436	Slow S-SWF	5	1+	AN, BE, HU, MC, PR, NE**
	1855	2005	S-SWF	5	3	AN, BE, HU, MC, PR, NE**
26	1630	1710	G-SWF	1	1-	AN, MC
	1930	2005	G-SWF	2	1	AN, MC
27	1318	1340	Slow S-SWF	5	1+	AN, BE, HU, MC, PR, NE**
28	2004	2050	G-SWF	4	1+	AN, BE, CO, MC, PR
	2348	2358	G-SWF	1	1-	AN, CO
29	1400	1500	G-SWF	2	1	AN, BE, MC
	1533	1602	Slow S-SWF	5	1	BE, HU, MC, PR
	1815	1850	G-SWF	3	1+	AN, MC, PR
30	1800	2000	G-SWF	3	1+	AN, BE, CO, HU, MC
31	2018	2030	Slow S-SWF	2	1+	AN, PR
	2319	2352	G-SWF	1	1	AN, CO

Notes: * Warning Section
Hiraiso Radio Wave Observatory
Radio Research Laboratories

** Netherlands Postal and Telecommunications
Services, Nederhorst den Berg

Nederhorst den Berg also reported S-SWF Oct. 2, 1219.5-1245 UT;
Oct. 25, 1157-1237 UT; and Oct. 29, 1215-1245 UT.

SOLAR RADIO WAVES (BOULDER) -- 167 MC

3-HOURLY AND DAILY FLUX

NOVEMBER 1955

Nov.	Flux					Variability					Observed Periods
	Hours UT					Hours UT					
	12	15	18	21	Daily	12	15	18	21	Daily	Hours UT
1955	15	18	21	24		15	18	21	24		

Radiometer Inoperative.

SOLAR RADIO WAVES (BOULDER) -- 460 MC

3-HOURLY AND DAILY FLUX

NOVEMBER 1955

Nov. 1955	Flux Hours UT 12-15	15-18	18-21	21-24	Flux Daily	Variability Hours UT 12-15	15-18	18-21	21-24	Variability Daily	Observed Periods Hours UT
1	--	37	37	--	37	0	0	0	0	0	1328-2345
2	--	32	32	--	32	0	0	0	0	0	1329-2344
3	--	31	32	--	31	0	0	1	0	1	1330-2343
4	--	31	30	--	31	0	0	(0)	(0)	(0)	1332-2341
5	--	29	30	--	30	0	0	(0)	(0)	(0)	1333-2148, 2208-2340
6	--	33	32	--	32	0	0	0	0	0	1334-2339
7	--	36	34	--	35	0	0	0	--	0	1335-1915
8	--	34	35	--	35	0	0	0	0	0	1336-2337
9	--	35	35	--	35	0	2	2	2	2	1337-2336
10	--	33	36	--	35	0	0	(0)	(0)	(0)	1338-2335
11	--	35	34	--	34	0	0	2	2	2	1340-2334
12	--	35	--	--	--	0	2	--	--	2	1341-1630
13	--	--	--	--	--	--	--	--	--	--	-- -- -- --
14	--	--	32	--	32	--	0	0	(0)	(0)	1702-2249, 2304-2332
15	--	52	42	--	45	0	2	0	2	2	1344-2331
16	--	35	34	--	34	0	0	1	1	1	1345-2331
17	--	34	32	--	33	0	2	2	(1)	2	1347-2329
18	--	31	32	--	32	2	(0)	(0)	(0)	2	1348-2324
19	--	30	30	--	30	0	(0)	(0)	0	(0)	1349-2327
20	--	30	29	--	30	0	0	0	(0)	(0)	1350-2326
21	--	30	30	--	30	0	0	(0)	(0)	(0)	1351-2233
22	--	30	30	--	30	0	(0)	(0)	(0)	(0)	1352-2324
23	--	30	30	--	29	0	(0)	(0)	(0)	(0)	1353-2324
24	--	30	29	--	29	0	0	0	0	0	1354-2323
25	--	30	29	--	29	0	(0)	(1)	(0)	(1)	1356-1501, 1602-2323
26	--	30	29	--	29	0	(0)	(0)	(0)	(0)	1357-2322
27	--	31	31	--	32	0	1	1	0	1	1358-2322
28	--	34	37	--	35	0	(0)	0	2	2	1359-2321
29	--	31	32	--	31	0	(1)	(0)	(0)	(1)	1400-2320
30	--	35	36	--	35	0	0	1	0	1	1401-2320

SOLAR RADIO WAVES (BOULDER) -- 167 MC

OUTSTANDING EVENTS

NOVEMBER 1955

Nov. 1955	Type	Start UT	Duration Hrs:Mins	Maximum Time UT	Maximum Inst. Flux	Maximum Smd. Flux	Remarks

Radiometer Inoperative.

OUTSTANDING EVENTS

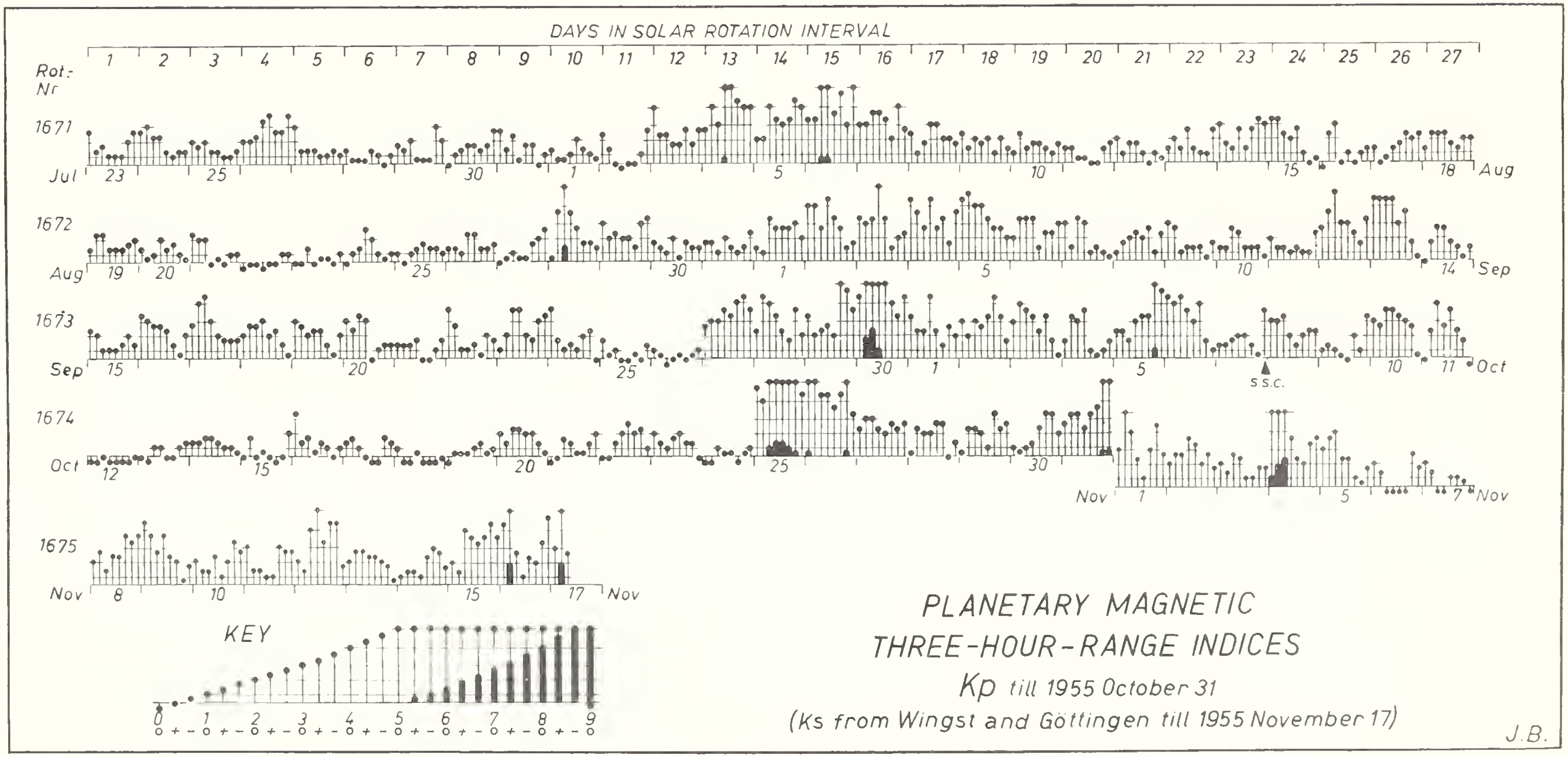
NOVEMBER 1955

Nov. 1955	Type	Start UT	Duration Hrs:Mins	Maximum Time UT	Maximum Inst. Flux	Maximum Smd. Flux	Remarks
1	6	(1328)	(10:17)	1700	--	7	
3	4	1947	00:13	1948.0	150	3	
6	8	1743.6	00:04	1746	90	21	
7	6	1335	(05:40)	~1600	--	10	
8	1	1617	04:12	1647	81	--	
8	0	1855.1	~00:10	1856	47	2	
8	6	2029	01:51	2040	97	4	
9	2	1605	00:04	1608	170	12	
9	8	1908.9	00:03.4	1911.5	240	25	
9	2	2052	00:04	2053.6	150	9	
9	2	2316	00:04	~2318	>950	23	
11	3	1936.9	00:01	1937.2	180	--	
11	2	2239	00:24	2241.7	160	2	
12	2	1539	00:14	1543	150	5	
15	6	(1344)	(09:47)	~1700	--	25	
15	8	1647.5	00:12	1657.8	160	42	
15	8	1735.8	00:05.7	1737	>1300	210	
15	8	2204.0	00:02.0	2205	740	230	
16	4	1834	00:04	1835	86	19	
16	3	2148.0	00:02.8	2149.0	61	12	
17	3	1543	00:00.8	1543.4	830	--	
17	3	2056.4	00:00.4	2056.6	810	--	
18	3	1436.4	00:02.0	1436.5	370	--	
27	3	1602.0	00:00.7	1602.4	140	--	
27	0	1710	00:21	1716.7	62	6	
27	3	1803.0	00:00.1	1803.0	160	--	
27	0	2215.0	00:03	2215.0	60	6	
28	6	1359	10:22	~1900	--	9	
28	3	2100.6	00:00.7	2100.6	140	--	
28	8	2309.8	00:01.6	2310.6	>1300	--	
29	3	1518.6	00:01	1518.9	730	--	
30	6	1401	08:19	~1900	--	7	
30	3	1943.8	00:00.7	1944.1	170	--	

GEOMAGNETIC ACTIVITY INDICES

OCTOBER 1955

Oct. 1955	C	Values Kp Three-hour Gr. interval 1 2 3 4	5 6 7 8	Sum	Ap	Final Selected Days
1	0.7	3+ 2+ 2+ 4+	2+ 1+ 3- 2o	21-	13	Five
2	1.0	3o 2o 3o 3-	3+ 4+ 3+ 2-	23+	15	Quiet
3	0.8	3o 4o 4- 3+	2+ 3+ 2- 1-	22o	15	
4	0.4	2- 3+ 3o 4-	1o 1- 1o 2-	16o	10	12
5	1.3	2+ 2+ 2- 3o	3+ 3+ 6- 5-	26+	23	13
						18
6	0.9	4+ 4o 4+ 4-	3o 4o 2- 1o	26o	21	19
7	0.5	1+ 1+ 2- 2o	2o 1+ 1- 4-	14o	8	24
8	0.9	3o 3o 3+ 2o	1+ 2o 2+ 2+	19+	11	
9	0.6	1o 1+ 1o 1-	0+ 2o 1o 3+	11-	6	
10	0.9	3o 3- 4- 4-	3+ 3o 3- 1-	23-	15	
11	0.6	0+ 2+ 4o 3-	4- 2+ 2- 0o	17o	11	Five
12	0.0	0o 0o 0+ 0o	0o 0o 0o 0+	1-	0	Disturbed
13	0.1	0+ 0o 1o 1o	0+ 0+ 1o 1+	5+	3	
14	0.1	1+ 1+ 2- 2-	1+ 1o 1o 1-	10o	5	5
15	0.1	0+ 2- 0+ 1-	0+ 0o 0+ 2o	6-	3	6
						25
16	0.3	3+ 1+ 2- 1-	1+ 1o 0+ 1o	11-	6	26
17	0.1	1+ 2- 1o 0+	0o 0o 2- 1+	7+	4	31
18	0.0	1o 0o 0o 1-	0o 0o 0o 0+	2o	1	
19	0.1	0o 1- 1- 1-	1o 1+ 1- 1o	6o	3	
20	0.4	2o 1+ 2+ 2+	2o 2o 1+ 1-	14o	6	
21	0.2	0o 0+ 2- 1+	1- 1- 1+ 2o	8o	4	Ten
22	0.5	0+ 0+ 1+ 2o	3- 2o 2+ 1o	12o	6	Quiet
23	0.3	2o 1+ 1o 2-	2o 1+ 1+ 0+	11o	5	
24	0.0	0o 0o 1o 1-	1- 0o 1- 1o	4o	2	12
25	1.7	5- 4o 6- 6o	6o 6- 5+ 4+	42-	56	13
						14
26	1.5	5+ 5o 4+ 4+	4- 4+ 6- 3+	36o	38	15
27	0.8	2+ 3o 3o 2+	2o 3- 2+ 3-	20+	11	17
28	0.4	1- 2+ 2o 2o	3- 3- 0+ 1+	14o	7	18
29	0.6	1- 2+ 2+ 2o	1o 3+ 2+ 3-	17-	9	19
30	0.7	1o 1- 1o 1+	2+ 3+ 3+ 2o	15o	8	21
31	1.3	3- 3+ 3+ 2+	3+ 4- 5+ 5+	29+	26	23
Mean:	0.57			Mean:	11	24



PLANETARY MAGNETIC
THREE-HOUR-RANGE INDICES
Kp till 1955 October 31
(Ks from Wingst and Göttingen till 1955 November 17)

NORTH ATLANTIC

OCTOBER 1955

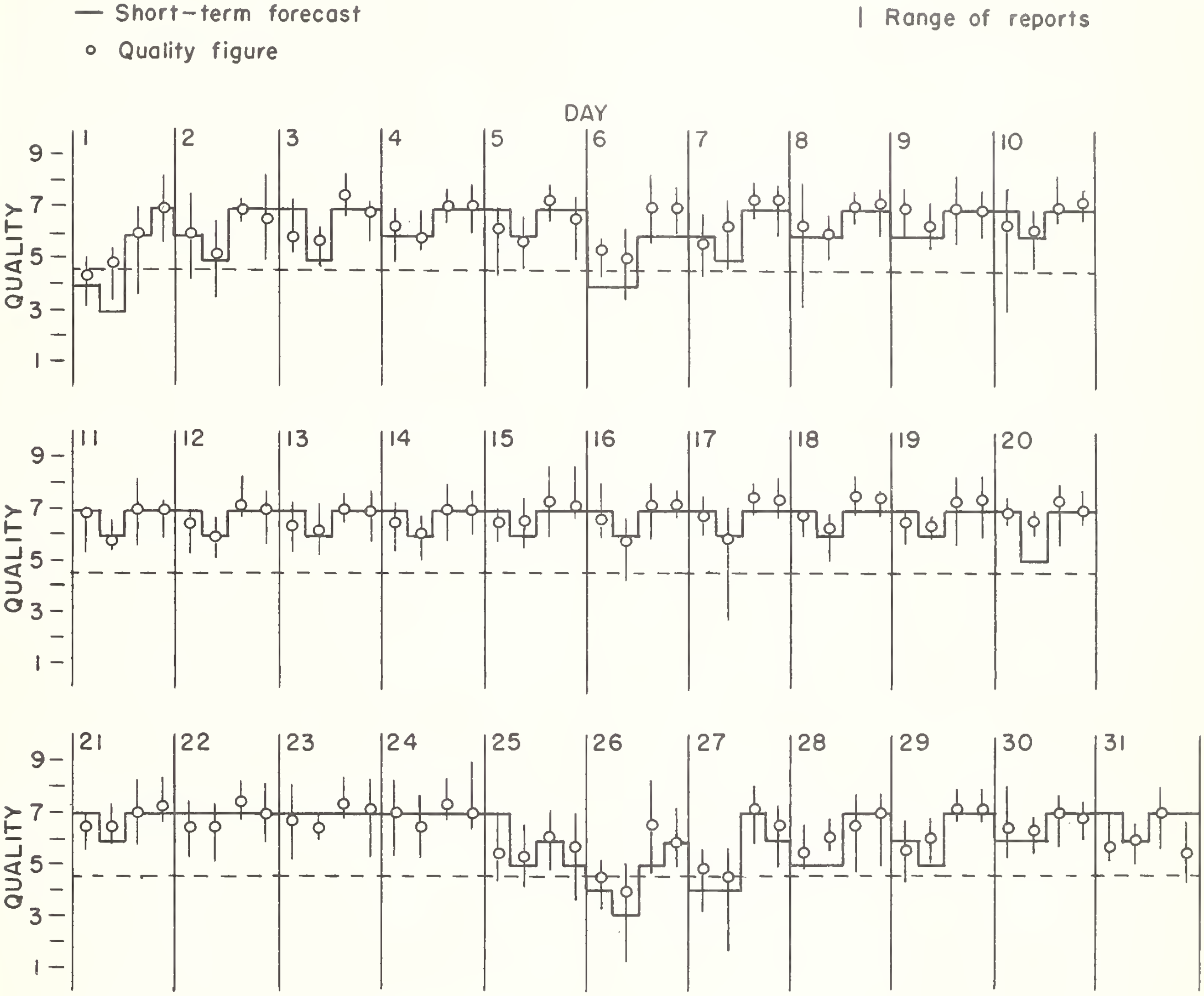
Oct. 1955	North Atlantic 6-hourly quality figures				Short-term forecasts issued about one hour in advance of:				Whole day index	Advance forecasts (J-reports) for whole day; issued in advance by:			Geomagnetic K_{Ch}	
	00 to 06	06 to 12	12 to 18	18 to 24	00	06	12	18		1-4 days	4-7 days	8-25 days	Half (1)	Day (2)
1	4+	5-	6o	7o	4	3	6	7	6-	5	5		3	2
2	6o	5+	7o	7-	6	5	7	7	6+	6	6		3	2
3	6o	6-	7+	7-	7	5	7	7	7-	6	6		(4)	1
4	6+	6o	7o	7o	6	6	7	7	7-	7	6		3	1
5	6+	6-	7+	7-	7	6	7	7	7-	7	6		2	3
6	5+	5o	7o	7o	4	4	6	6	6+	7	6		(4)	2
7	6-	6+	7+	7+	6	5	7	7	7-	5	6		1	2
8	6+	6o	7o	7+	6	6	7	7	7-	5	6		3	2
9	7o	6+	7o	7o	6	6	7	7	7o	6	6		1	2
10	6+	6+	7o	7+	7	6	7	7	7o	6	6		3	2
11	7-	6-	7o	7o	7	6	7	7	7-	7	6		3	2
12	6+	6o	7+	7o	7	6	7	7	7-	7	6		0	0
13	7-	6+	7o	7o	7	6	7	7	7-	7	6		1	1
14	7-	6o	7o	7o	7	6	7	7	7-	7	6		2	1
15	7-	7-	7+	7+	7	6	7	7	7o	7	6		1	1
16	7-	6-	7+	7+	7	6	7	7	7-	7	6		2	1
17	7-	6-	7+	7+	7	6	7	7	7o	7	6		2	1
18	7-	6+	8-	7+	7	6	7	7	7o	7	7		0	0
19	7-	6+	7+	7+	7	6	7	7	7o	7	7		1	2
20	7o	7-	7+	7o	7	5	7	7	7o	7	7		2	1
21	7-	7-	7o	7+	7	6	7	7	7o	7	7		1	1
22	7-	7-	7+	7o	7	7	7	7	7o	7	7		1	2
23	7-	7-	7+	7+	7	7	7	7	7o	7	7		1	2
24	7o	7-	7+	7o	7	7	7	7	7o	7	7		0	1
25	6-	5+	6+	6-	7	5	6	5	6-	7	6		(4)	(4)
26	4+	4-	7-	6o	4	3	5	6	5o	4	4	X	(5)	(4)
27	5-	5-	7+	7-	4	4	7	6	6+	4	4	X	3	2
28	6-	6+	7-	7o	5	5	7	7	7-	6	4	X	2	1
29	6-	6+	7+	7+	6	5	7	7	7-	6	5		2	2
30	7-	6+	7o	7-	6	6	7	7	7-	7	6		1	2
31	6-	6o	7o	6-	7	6	7	7	6+	7	7		3	3

Score:		00	06	12	18	1-4 days	4-7 days
Quiet Periods	P	18	20	28	27	18	10
	S	11	8	2	4	10	18
	U	0	2	1	0	2	1
	F	0	0	0	0	1	2
Disturbed Periods	P	2	0	0	0	0	0
	S	0	1	0	0	0	0
	U	0	0	0	0	0	0
	F	0	0	0	0	0	0

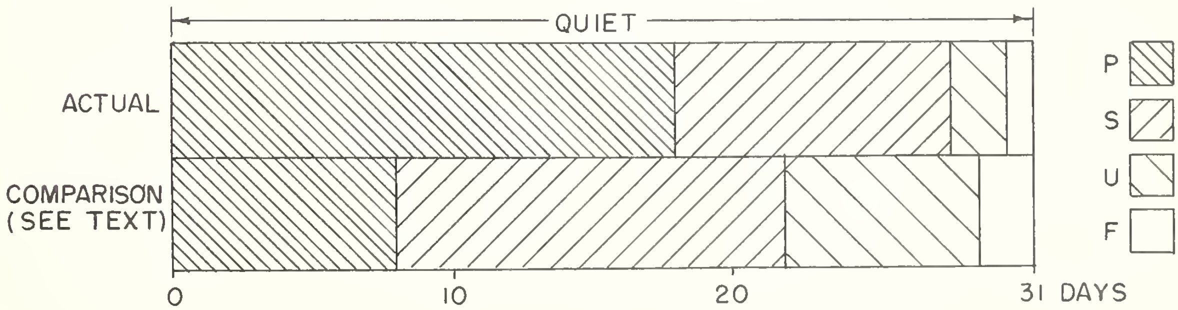
CRPL RADIO PROPAGATION QUALITY FIGURES AND FORECASTS

NORTH ATLANTIC

OCTOBER 1955

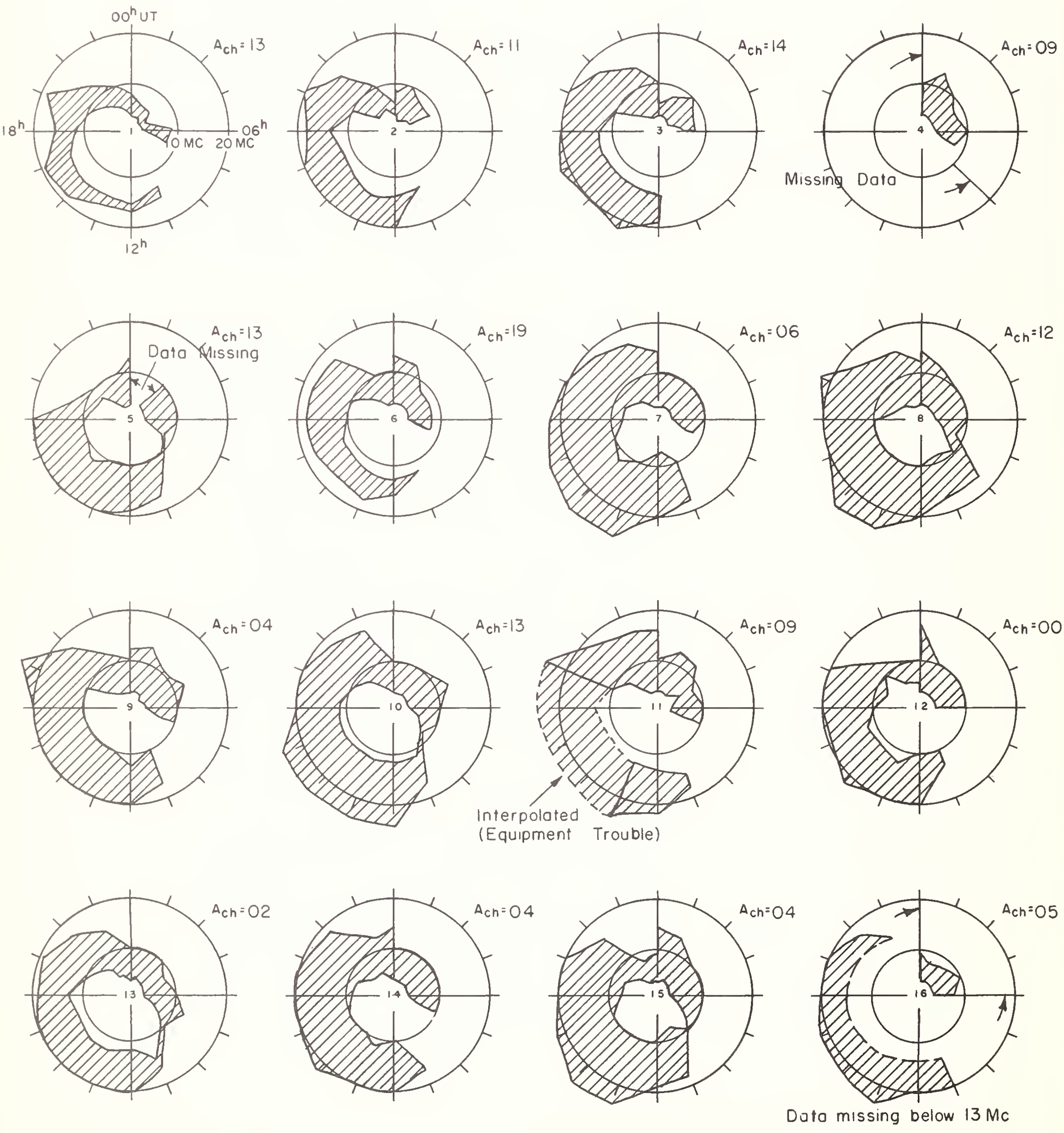


OUTCOME OF ADVANCE FORECASTS (1 TO 4 DAYS AHEAD)

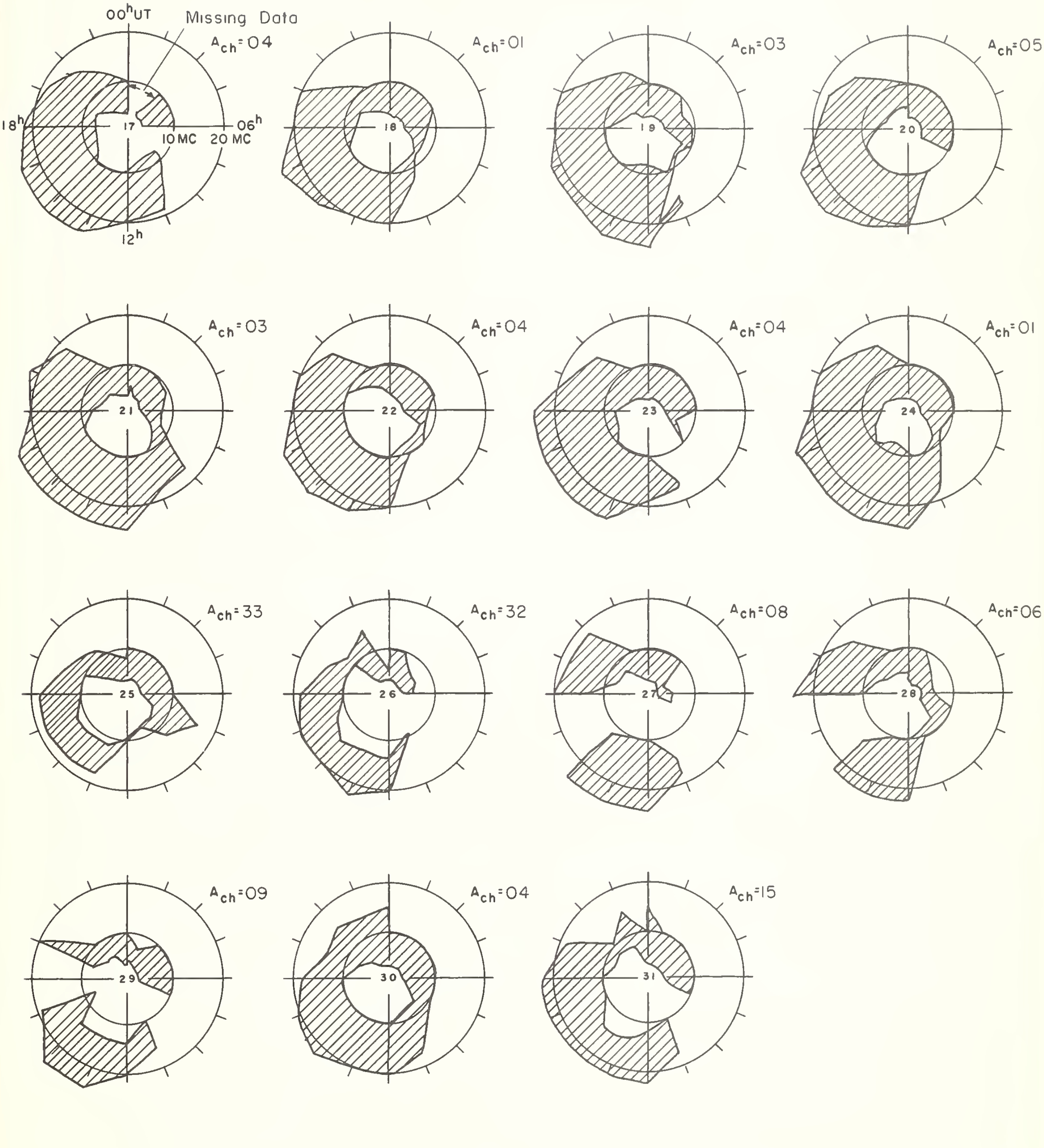


USEFUL FREQUENCY RANGES -- NORTH ATLANTIC PATH

OCTOBER 1955



OCTOBER 1955



Adapted from Observations by Deutschen Bundespost

CRPL RADIO PROPAGATION QUALITY FIGURES AND FORECASTS

NORTH PACIFIC

OCTOBER 1955

Oct. 1955	North Pacific 9-hourly quality figures			Short-term forecasts issued at			Whole day index	Advance forecasts (Jp reports) for whole day; issued in advance by:			Geomagnetic K_{Si}	
	03 to 12	09 to 18	18 to 03	02	09	18		1-4 days	4-7 days	8-25 days	Half day (1)	(2)
1	2	3	7	4	3	5	(3)	3	5		3	2
2	2	4	6	5	4	5	(4)	4	5		3	3
3	4	6	5	5	5	5	(4)	4	5		(4)	2
4	4	5	6	5	5	6	5	5	6		3	1
5	5	5	6	5	5	5	5	6	5		1	(4)
6	5	5	6	5	4	5	5	6	5		(5)	3
7	5	4	7	5	5	6	5	6	5		1	2
8	5	5	7	6	5	6	6	6	5		2	2
9	6	6	7	6	6	7	6	5	5		0	1
10	6	5	7	6	4	6	6	5	5		3	2
11	5	4	7	6	4	6	5	5	5		3	2
12	6	5	7	6	6	7	6	6	6		0	0
13	5	5	7	6	5	7	6	5	6		1	1
14	7	6	8	7	6	7	7	5	6		1	1
15	5	5	7	7	6	6	6	6	5		1	0
16	6	6	8	7	6	7	6	6	6		1	1
17	6	6	8	7	6	7	7	6	6		0	1
18	6	6	7	7	6	7	7	7	6		0	0
19	6	6	8	7	7	7	7	7	7		0	1
20	6	6	8	7	7	7	7	7	7		2	1
21	5	5	8	7	6	7	6	7	6		1	1
22	6	5	8	6	7	7	6	6	7		1	2
23	6	6	8	7	7	7	7	6	7		1	1
24	6	6	8	7	7	7	7	6	6		1	0
25	4	1	3	7	3	3	(3)	6	6		(5)	(5)
26	3	3	2	3	3	4	(2)	3	5		(5)	(4)
27	3	3	5	4	3	5	(4)	3	4		3	2
28	5	4	5	6	5	5	5	4	4		2	2
29	5	5	6	5	5	6	5	4	3		1	1
30	5	5	6	6	5	6	5	5	5		1	3
31	5	5	5	6	5	6	5	5	5		3	(4)

Score		02	09	18	1-4	4-7
Quiet Periods	P	9	12	10	12	13
	S	13	10	18	12	11
	U	2	1	1	1	1
	F	0	0	0	0	0
Disturbed Periods	P	1	5	1	3	1
	S	3	2	0	2	2
	U	1	1	1	0	1
	F	2	0	0	1	2

( ) represent disturbed values

CRPL RADIO PROPAGATION QUALITY FIGURES AND FORECASTS

NORTH PACIFIC

OCTOBER 1955